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ABSTRACT

A study was conducted of the language development of a hearing child whose mother was deaf and communicated only in sign and whose father was hearing and communicated in both sign and oral language. Results showed similarities in development between the two modalities as well as similarity between development in two separate modalities and two oral languages. Manual and oral "babbling" occurred in early stages, and one-word utterances preceded combinations of words. In later development, lexical code-switching began, in which the child chose her code based on the communicative needs of her addressee. Interference surfaced when syntactic constructions permitted in only one modality occurred in the other. Two separate, complementary lexicons developed, with little overlap of lexical items. However, at the onset of code-switching, the child began to distinguish between the two lexicons. The occurrence of a particular lexical item was greatly influenced by the contextual conditions in which it was learned. Thus, the rate and sequence in which semantic relations emerged in signing paralleled that of oral language, and learning in two modalities with approximately equal exposure to both codes did not affect semantic development. (PJM)

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Acquisition of American Sign Language and Spoken English in a Hearing Child of a Deaf Mother and Hearing Father: Phase II-Early Combinatorial Patterns of Communication

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INTRODUCTION. During the past decade there has been an increased interest in the process of bilingual and second language acquisition in children and particularly the influence of first language acquisition research on that of second language development (Hakuta and Cancino 1977). A variety of different methodological approaches (e.g., contrastive, error, performance, and discourse analysis) have been applied to studies investigating the simultaneous and successive acquisition of more than one language (Hakuta et. al. 1977; McLaughlin 1977). Most of the studies reported concern the process(es) by which a child becomes bilingual in two or more oral languages (Ronjat 1913; Leopold 1939-49; Volterra and Taeschner 1978). As far as we were able to ascertain, there has been no systematic and reliable research on the development of bilingual competence in languages representing two separate modalities (i.e., oral-aural and manual-visual).

RESEARCH ON THE ACQUISITION OF AMERICAN SIGN LANGUAGE (ASL). Most previous studies involving the acquisition of language in the manual-visual mode have concentrated on a comparison of the acquisition of ASL in deaf children of deaf parents with that of the development of oral language in hearing children. Several researchers have reported that children acquiring ASL pass through developmental stages similar to hearing children acquiring spoken English. Fischer (1974) reported that hearing children begin to babble "orally" and deaf children of deaf parents "manually" at approximately 6 months of age. At about one, hearing children generate one-word utterances; however, deaf children frequently produce single signs several months prior to this stage of language development. Between 18 to 24 months of age, hearing children begin to form two- and three-word utterances while their deaf counterparts are frequently producing two- and three-sign strings between 4 to 6 months earlier.

There appears to be a parallel increase in mean length of utterance (MLU) in both populations (Siple 1973). Several longitudinal studies of ASL acquisition provide evidence for Brown's (1973) universal principle that for all languages, the utterances in Stage 1 express a limited number of semantic relations which are ordered developmentally (Collins-Ahlgren 1975; Fischer 1974; Klima and Bellugi 1972; Schlesinger and Meadow 1972; Nash 1973).

Correspondingly, there seems to be another parallel in the acquisition of specific syntactic and morphological structures. For example, the acquisition of negation in ASL appears to develop similar to that in English although specific grammatical relations (e.g., locative relations) may be expressed differently (Fischer 1974; Klima and Bellugi 1972; Collins-Ahlgren 1975).

SIMULTANEOUS LINGUISTIC DEVELOPMENT IN TWO MODALITIES. The present research describes the second phase of a longitudinal study of the simultaneous linguistic acquisition of a spoken language (English) and a visual language (ASL) in a hearing child, Anya, the first born daughter of a profoundly deaf mother and a hearing father. The focus of this aspect of the research is on the "transitional" point of language development between the one-word and combinatorial stage which has been discussed by various first language

researchers (Bloom 1979; Greenfield and Smith 1976; McNeil 1974; Brannigan 1976). The research questions posed were: Does a child acquiring languages in two separate modalities pass through the same linguistic stages as a child acquiring two oral languages? Are the bilingual strategies similar in both cases? Does the child develop a separate linguistic rule system for each language?

The data on Anya were collected from the time when the first sign emerged at 7 months, 6 days, to the age of 21 months, when she was home during monthly 30-minute play sessions and detailed contextual notes were recorded during each observation. Both parents were present during all video-taping sessions and all signifiers (i.e., words, signs, or signs plus words) were transcribed. Additionally, all new signs and words used by the child spontaneously, or in imitation of others, were noted in a diary. Two experimenters transcribed the data, analyzed signifiers used by Anya (both in terms of their semantic relations and syntactic constructions) and compared judgments on all ambiguous items. Inter-judge reliability was established at .93.

The first phase of Anya's simultaneous development in English and ASL emphasized the child's acquisition of early word meanings (Prinz and Prinz in press). The results of this earlier study on developmental "psycholexicography" - (a term coined by Miller and Johnson-Laird 1976), indicated that the child's first sign emerged several months before the first spoken word; and, secondly, that her lexical acquisition in ASL and spoken English progressed through states similar to that of hearing children learning two different oral languages. Initially, Anya appeared to develop one semantic system with separate lexical entries from both languages. Additionally, early findings suggested that the rate and sequence in which semantic relations emerged in sign language was similar to that of English and that learning languages in two different modalities did not seem to interfere with semantic development. This notion was re-examined during the second phase of the study--approximately the point in development when Anya was beginning to combine signifiers.

* RESULTS: SECOND PHASE OF THE LONGITUDINAL RESEARCH.
MANUAL BABBLING. Early in her development Anya exhibited "oral" as well as "manual" or gestural babbling behavior in that she would wave her hands in apparent imitation of signs produced by her parents. The manual babbling first appeared around 6 months of age and continued through the age of 21 months. Frequently between the age of 9 and 17 months, Anya would mix oral with manual babbling similar to the way in which she combined signifiers (i.e., signs plus words) to convey meaning. For example, at age 14 months, 3 days, Anya had been conversing with her mother about a bug which had landed on the wall in her bedroom. At one point in the conversation, Anya initiated a monologue which incorporated both oral and manual babbling with no intelligible words and only one discernible sign--her home sign for BUG.

* For notational purposes all signed signifiers are represented in capital letters, spoken utterances in lower case letters within quotation marks, and signifiers which are simultaneously signed and spoken are in upper case letters within quotation marks.

Upon examining Anya's handshape ("phonological") acquisition, we concluded that the specific stages of hand configuration were not as distinctly delineated as those reported by Boyes (1973) and McIntire (1974). However, Anya's phonological acquisition in both ASL and English still conformed to many of the phonological rules operative for all languages. Between 5 and 17 months, Anya produced "baby" signs comparable to baby words of hearing children of hearing parents. Examining these signs more closely we observed that where an inappropriate or inaccurate handshape was employed for a sign, the substituted structure was less marked. At age 8 months, for example, Anya produced the sign for DADDY by striking here entire fist against the forehead. It was not until several months later that she was able to generate the more marked form where the thumb is placed against the forehead with the fingers spread apart.

COMBINATORIAL STRINGS. Examination of Anya's early combinatorial linguistic productions revealed that she could readily convey communicative intent via signs, words, or by combining oral and manual signifiers. For example, at the age of 15 months, Anya and her mother were discussing the fact that Anya's baby doll needed her diapers changed. At one point in the conversation Anya employed an oral vocative "Daddy!" plus a universal sign for "stink" or bad odor to inform her father that the baby's diapers needed to be changed. Anya's mother switched the subject and asked her if she wanted to go for a walk. Since it was winter and snowing outside, it was deemed necessary to put on Anya's boots. Combining speech and sign, Anya proclaimed, "Where are the BOOTS?" While playing with her toys on another occasion, Anya was inspired by the "Jack in the box" and spontaneously signed TELEPHONE. She then proceeded to run into the room where the phone was located and came back to announce in sign and speech that the phone was still "beeping."

At approximately 19 months of age, Anya was beginning to demonstrate a more conscious and deliberate ability to code-switch from one linguistic system to the other based on the communicative needs of the addressee. The following conversational sequence exemplifies this phenomenon. While playing hide and seek with a handpuppet of a duck, the child initially inquired "Where's the duck?" Not receiving an adequate response from her mother, Anya altered her linguistic production strategy and simultaneously used a sign for "nonexistence" as she repeated the same question--only this time encoding her utterance simultaneously in speech and sign--"WHERE'S DUCK?" The second time she repeated the question, she incorporated the article, "the," in the linguistic construction which suggests she possessed knowledge of some of the grammatical rules of both ASL and English. Her early application of the rules of both languages was not unlike the notion of an "interlanguage," which incorporates aspects of both the native and target language of the second language learner (Hakuta and Cancino 1977). It could be hypothesized that "simultaneous" language learners may also proceed through stages of intermediate grammars described by Selinker (1972).

However, the incorporation of grammatical rules from both languages constituted the exception rather than the rule during the early combinatorial stage of Anya's development. The child frequently applied the same syntactic rules to both languages--sometimes using the rules of English and sometimes the rules of ASL. A variety of syntactic rules

exist in ASL which are significantly different from English. To demonstrate this phenomenon, we will consider three grammatical examples from both languages:

(1) Use of reduplication in ASL;

(2) Use of Incorporation in ASL; and

(3) Use of Possessive Case in English.

According to Fischer (1974), reduplication in sign language is typically used to express plurality, or the iteration, duration, and/or cessation of an action. The use of reduplication to express plurality was frequently occurring in Anya's linguistic corpus between the age of 14 and 21 months (e.g., she would sign MILK MILK; WATER WATER; GUM GUM when requesting these commodities). At a later stage of development this construction carried over into English where she orally produced the same forms.

Incorporation of both subject and verb or verb and object or even all three, within a single sign, occurs frequently in ASL (Klima and Bellugi 1979; Wilbur 1979). Early in her development, at approximately 15 months of age, Anya had acquired the WH-morpheme in sign. For example, she would put a blanket over her head and sign WHERE ANYA?--the auxiliary verb, "is," had been incorporated into the construction. At approximately 20 months, she began using the English construction WHERE + NP. As with the sign construction, Anya used it consistently in conversations. (It was not until the age of 22 months when she began to use the English equivalent, Where + is + NP). Several English constructions containing equivalent or similar structures in ASL were used to indicate either the continuation or cessation of an action (e.g., "ALLGONE GUM" when she had swallowed her gum or "ALLGONE THE WATER" when pointing to an empty water drain in the middle of a parking lot or "MOREUP" after descending in an elevator).

A few parallels between syntactic development in English and ASL were beginning to emerge in Anya's linguistic productions. For example, data collected between 17 months, 3 days and 19 months, 8 days, support Brannigan's (1976) hypothesis of "replacement sequences" prior to the emergence of combinatorial language. Anya would string together two or three signifiers (either words or signs or a combination of both) with a slight pause between structures. However, the ability to utilize lexical items from two different languages to refer to the same object or event and the corresponding developing ability to code-switch from one lexical system to another depending on addressee variables (e.g., age, sex, etc.) was only beginning to be extended to the syntactic component.

TWO SEPARATE LEXICONS. Initially, Anya's spoken vocabulary complemented her sign vocabulary, with only a small overlap of words that were both signed and spoken. During the first 14 months, the results showed that less than 16 percent of the signifiers consisted of words plus signs. This supports the hypothesis formulated by Stokes and Menyuk (1975) that the child acquiring ASL and English constructs a basic concept of an object

or event and encodes it either in one modality or the other but seldom in both. Thus, as Volterra and Taeschner and found with their young children learning two oral languages (German and Italian), during the first stage the child appears to develop one lexical system with separate entries from both languages.

However, upon examining the data collected between 14 and 21 months, we noticed that Anya was beginning to differentiate between two separate lexical systems in that the same object or event was more frequently expressed with two different signifiers. For example, when asking her mother for a drink of water at 18 months and 28 days, Anya signed WATER. A few days later at age 19 months, 5 days, she asked her father for a drink of water and said, "Daddy, water." This was approximately the point when Anya began to behave differentially towards her mother and father. When communicating with her mother, Anya would typically eliminate voicing, tap her mother's shoulder or wave an arm in front of her face to gain her mother's attention and then proceed to sign. She used voicing consistently and gradually signed less frequently with hearing members of the family. This trend toward almost exclusive usage of one linguistic system which is associated primarily with the major user of the code was also documented by Volterra and Taeschner (1978) in the two children they followed. Thus, it is during this so-called "second stage" of bilingual development reported by Volterra and Taeschner, that the child begins distinguishing between two different lexicons. However, the pragmatic and contextual circumstances in which a signifier is learned still appear to greatly influence its usage in conversation. To examplify this phenomenon, consider the following conversation between Anya and her mother when Anya was 18 months, 12 days:

M: (shows Anya a picture book)

A: signs HORSE

M: (points to a picture) signs WHAT?

A: says "that one" signs DOG
signs MORE HORSE?

One month later, Anya and her father were looking at the same pciture book and the following conversation took place:

F: (signing and speaking simultaneously) "WHAT DO YOU SEE?"

A: signs BOAT BOAT signs and says "WATER"

F: (signing and speaking) "WHAT IS THAT?"

A: (signing and speaking) "HORSE"

Anya had acquired the signs for "boat," "horse," and "water" before the spoken words and she continued using the signs even when uttering the equivalent signifiers in English. The fact that Anya produced some signs regardless of whether the addressee was hearing or deaf, would indicate that the process of generalization was not yet complete. As Volterra and Taeschner have stated, "The child must detach one word from a certain

specific context and identify that word with the corresponding word in the other language." (1978, page 318). Eventually, the child learns to efficiently translate from one language into another. This "transitional stage" in lexical development where words and signs were combined in seemingly random fashion might be explained by the fact that some of the signifiers were acquired at differing times in her development and that the signifier may be bound to a particular context in which it was learned. For example, between the ages of 14 to 19 months, whenever Anya saw her father's briefcase, she signed DADDY WORK because her mother had always signed DADDY GO WORK NOW every morning when her father left for work with his briefcase.

By the age of 19 months, Anya was consistently using a variety of individual signifiers in combination with gestures and intonation to serve a variety of pragmatic functions (e.g., requesting, greeting, teasing). The "mean length of signifier" (MLS) paralleled the mean length of utterance (MLU) of hearing children of the same chronological age who were learning English. Comparing Anya's linguistic development with that of Eve and Sarah studied by Brown and his colleagues (1973), it was found that at age 19 months, Eve's MLU was 1.80; Sarah's was 1,85; while Anya's MLS was 1.85.

Throughout her development, Anya successfully used signs and spoken words to express various semantic relations. This finding is consistent with previous results of studies indicating that the full range of semantic relations found in children learning spoken languages is expressed by children acquiring ASL (Ashbrook 1977; Bellugi and Klima 1972; Hoffmeister 1977). Furthermore, the sequence in which semantic relations emerged in Anya's development approximated that of both children learning English and deaf children of deaf parents acquiring ASL (Newport and Ashbrook 1977). Existence relations appeared in the earliest utterances followed by more complex verb relations and non-locational relations before relations expressing locations of objects in space. For example, Anya pointed to and named objects in sign prior to producing action states. An examining single sign utterances of deaf children, Newport and Ashbrook found that young children do not appear to utilize the incorporate syntactic devices used in adult sign. Until the age of 14 months, this seemed to be the case in Anya's development: Relations were expressed by producing a separate and explicit sign for each argument, with each argument represented in a fixed order. However, as she began combining signifiers on a consistent basis after the age of 19 months, Anya began making use of the syntactic devices particular to ASL and English.

CONCLUSION. In summary, it appears that Anya is successfully acquiring language in two different modalities and that her linguistic development in sign and speech is parallel to that of hearing children simultaneously learning two or more oral languages. During this "transitional" stage when Anya was beginning to more systematically combine signifiers, she was also starting to differentiate between two distinct lexicons: One in sign and one in spoken English. Within this early phase of her linguistic development she did not distinguish regularly between the syntactic rule systems of both languages.

This stage in Anya's bilingual development was also "transitional" in the sense that she was beginning to associate signing with her mother and speaking with her father and other hearing members of the family. Furthermore, the child was starting to successfully modify her mode of linguistic presentation to accommodate the primary communicative needs of the addressee. In essence, this constituted the early emergence of code-switching ability across two completely different linguistic modes.

The data has led us to tentatively conclude that the rate and sequence in which semantic relations emerged in Anya's signing was similar to that of spoken English in hearing children of hearing parents. This would seem to imply that learning languages in two different modalities and with approximately equal exposure to both linguistic codes does not interfere with semantic development. Furthermore, Anya's overall communicative effectiveness does not appear to be impaired or retarded: she successfully conveys messages to hearing and deaf addressees alike through ASL, English or a combination of the two systems. Continued study of Anya's language acquisition--focusing on syntactic and pragmatic development--should provide valuable information relative to the issue of bilingualism and "bilingual interference" in oral and manual linguistic systems.

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